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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/679,097	10/04/2000	Tsutomu Yamada	YKI-0058	9653

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EXAMINER	
JORGENSEN, LELAND R	

ART UNIT	PAPER NUMBER
2675	7

DATE MAILED: 07/30/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No.	Applicant(s)
	09/679,097	YAMADA, TSUTOMU
	Examiner	Art Unit
	Leland R. Jorgensen	2675

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 10/04/2002 .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1 - 18 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1 - 18 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,4, 5 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2 and 10 – 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ukai in view of Komiya, USPN 6,204,610.

Claim 1

Claim 1 describes a color display device. The color display device comprises, corresponding to each display pixel, a self-emissive element for emitting light of a predetermined color and a driving thin film transistor (TFT) connected to the self-emissive element for supplying a drive current to the self-emissive element. The size of the driving TFT in a display pixel for one color is altered from that in a display pixel for another color. The specification states "In the present invention, transistor size of a TFT refers to the ratio of the channel width W to the channel length L in the TFT channel, namely , W/L." Specification, page 10, lines 3 – 5. Ukai teaches that the size of the driving TFT in a display pixel for one color is altered from that in a display pixel for another color. Ukai, col. 3, lines 21 – 50.

Ukai does not teach a self-emissive element for emitting light of a predetermined color and a driving thin film transistor (TFT) connected to the self-emissive element for supplying a drive current to the self-emissive element.

Komiya teaches a self-emissive element for emitting light of a predetermined color and a driving thin film transistor (TFT) connected to the self-emissive element for supplying a drive current to the self-emissive element. Komiya, col. 1, lines 7 – 13.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use electroluminescence elements of Komiya with the display of Ukai. Komiya invites the use of self-emissive elements in a display.

> Organic EL elements are suited for liquid crystal displays with reduced thickness because organic EL elements are self-emissive and therefore do not require a backlight. Furthermore, organic EL elements do not restrict the viewing angle of display devices in which they are employed. For these reasons, it is widely expected that organic EL displays will be as the primary display devices of the next generation.

Komiya, col. 1, lines 11 - 17. Komiya teaches further advantages.

> When displaying an image in which light-emitting pixels dominate a large area in the overall display screen, if the luminance of the light-emitting pixels is too high, the displayed image may become glaring or bright, and unpleasant to the viewer's eyes. The above-mentioned power source voltage may therefore be lowered to set a lower maximum current value, such that the pixels emit light at a slightly reduced luminance. Under such a setting, the emissive luminance becomes similarly reduced when displaying an image in which light-emitting pixels cover only a small area of the overall display screen, producing a display image having a low contrast. However, if the power source voltage is set at a high level to allow the pixels to emit light at an increased luminance suitable for an image having a small area covered with light-emitting pixels, the display screen again becomes glaringly bright in the viewer's eyes when displaying an image having a large area dominated by light-emitting pixels. Furthermore, power consumption will be undesirably increased.

Komiya, col. 2, lines 12 –31. Komiya adds,

> To accomplish the above object, the present invention provides an electroluminescence display device having a plurality of pixels. Each pixel comprises an electroluminescence element including at least an emissive layer between an anode separately provided for each pixel and a cathode commonly provided for the plurality of pixels. Each pixel further comprises at least a switch element for controlling a current supply from a power source commonly provided

> for the plurality of pixels to the anodes of the electroluminescence elements. In this display device, a current flowing from the common cathode provided for the plurality of pixels is detected, and emissive luminance of the electroluminescence elements is controlled according to the detected current.

Komiya, col. 2, lines 38 – 51. Komiya concludes, "By employing such a manner of control, the luminance of each electroluminescence element can be easily and reliably controlled." Komiya, col. 3, lines 56 – 58. See also, Komiya, col. 6, lines 4 – 49.

Claim 2

Claim 2 is dependant on claim 1. Komiya teaches an electroluminescence display that has, corresponding to each display pixel, a switching TFT 21 for controlling turning on and off of a driving TFT 24 and a current there through. Komiya, col. 4, lines 22 – 41; and figure 3.

Claim 10

Claim 10 is dependant on claim 1. Komiya teaches that the self-emissive element is an electroluminescence element. Komiya, col. 1, lines 7 – 9.

Claim 11

Claim 11 is dependant on claim 1 and adds that the size of the driving TFT is altered by changing a gate width according to emitting color while a gate length is fixed.

Neither Ukai nor Komiya specifically state that the size of the driving TFT is altered by changing a gate width according to emitting color while a gate length is fixed.

It would have been obvious to one of ordinary skill in the art at the time of the invention to alter the size of the driving TFT by changing a gate width according to emitting color while a gate length is fixed. Ukai invites such step.

> Such control of the ration W/L of the thin film transistor of each color can easily be effected by selecting the size of a mask which determines the ratio W/L, during the manufacture of the liquid crystal display element.

Ukai, col. 3, lines 46 – 50.

It would have been obvious to one of ordinary skill in the art at the time of the invention to control the ration W/L by fixing the gate length L while changing the gate width W.

Claim 12

Claim 12 is dependant on claim 1 and adds that the size of the driving TFT is altered by changing a gate length according to emitting color while a gate width is fixed. For the reasons discussed in the response to claim 11, it would have been obvious to one of ordinary skill in the art at the time of the invention to control the ration W/L by fixing the gate width W while changing the gate length L.

3. Claims 3 – 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ukai in view of Komiya as applied to claim 1 above, and further in view of Rumbaugh, USPN 6,072,272.

Claim 3

Claim 3 is dependant on claim 1 and adds that the size of the driving TFT is determined according to an emissive efficiency of a self-emissive element connected to the driving TFT. Ukai teaches varying the size of the driving TFT according to the different light transmission characteristics for each color. Ukai, col. 4, lines 47 – 54; col. 4 and lines 47 – 56.

Neither Ukai nor Komiya specifically teach that the different light transmission characteristics for each color is the emissive efficiency of each color self-emissive element.

Rumbaugh teaches display pixels configured to compensate for the emissive efficiency of each color self-emissive element. Rumbaugh, col. 3, lines 33 – 45; and col. 4, lines 39 – 55.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Rumbaugh with the teachings of Ukai and Komiya to produce a display wherein the size of the driving TFT is determined according to an emissive efficiency of a self-emissive element connected to the driving TFT. Rumbaugh teaches the need to adjust the each pixel according to the emission efficiency of peach self-emissive element.

> In forming subpixels to have a surface area and position determined by the light emission efficiency of the particular phosphor, the invention provides a display having improved color performance.

Rumbaugh, col. 3, lines 25 – 29. Rumbaugh adds,

> To further enhance color performance, the area ratios of the red, green, and blue subpixels can be adjusted depending upon the particular phosphor, and the desired white color coordinate. In particular, the blue subpixels arrayed on the anode of a display formed in accordance with the invention have a larger surface area than either the red subpixels or the green subpixels. Additionally, the red subpixels have a greater surface area on the anode than the green subpixels. Accordingly, anodes fabricated in accordance with the invention contain a plurality of subpixels, in which the surface area of each blue subpixel in greater than the surface area of each red subpixel, and the surface area of each red subpixel is greater than the surface area of each green subpixel.

Rumbaugh, col. 3, lines 33 - 49. Although Rumbaugh teaches an relationship between the size of the pixel area and the size of the emissive efficiency, the logic would equally apply to the size of the driving TFT and the emissive efficiency.

Claim 4

Claim 4 is dependant on claim 3. Rumbaugh teaches that emissive area of a pixel having a high emissive efficiency is set smaller compared to the emissive area of a pixel connected to a self-emissive element having a low emissive efficiency. Rumbaugh, col. 4, lines 51 – 55.

Claim 5

Claim 5 is dependant on claim 3. Rumbaugh teaches that emissive area of a pixel having a high emissive efficiency is set smaller compared to the emissive area of a pixel connected to a self-emissive element having a low emissive efficiency. Rumbaugh, col. 4, lines 51 – 55.

Claim 6

Claim 6 is dependant on claim 5. Rumbaugh teaches that green has the highest emission efficiency. Rumbaugh, col. 3, lines 4 – 6; and col. 4, lines 49 – 51.

Claim 7

Claim 7 is dependant on claim 3. Rumbaugh teaches that emissive area of a pixel having a lowest emissive efficiency is set larger compared to the emissive area of a pixel connected to a self-emissive element having a high emissive efficiency. Rumbaugh, col. 4, lines 51 – 55.

Claim 8

Claim 8 is dependant on claim 7. Rumbaugh teaches that blue has the lowest emission efficiency and red has a lower emission efficiency than green. Rumbaugh, col. 4, lines 51 – 55.

Claim 9

Claim 9 is dependant on claim 3. Rumbaugh teaches that emissive area of a pixel is made successively larger as the emissive efficiency decreases. Rumbaugh, col. 4, lines 51 – 55.

4. Claims 13 - 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ukai and Komiya in view of Rumbaugh as applied to claims 1 and 3 above, and further in view of Codama et al., USPN 6,121,726.

Claim 13

Claim 13 describes a color display device. Ukai, Komiya, and Rumbaugh teach a color display device. As discussed in the rejection to claim 1, Ukai and Komiya teach a self-emissive element for emitting light of a predetermined color and a driving thin film transistor (TFT) connected to the self-emissive element for supplying a drive current to the self-emissive element. As discussed in the rejections to claim 1 and claim 3, Ukai and Komiya in view of Rumbaugh teaches that size of the driving TFT in a display pixel for one color is set for every color in accordance with the emission efficiency of the emissive element disposed at the display pixel.

Claim 13 adds that the that size of the driving TFT in a display pixel for one color is set for every color in accordance with the chromaticity of each color emitted by respective emissive element and the chromaticity of target display white of the display device. Rumbaugh teaches "To further enhance color performance, the area ratios of the red, green, and blue subpixels can be adjusted depending upon the particular phosphor, and the desired white color coordinate." Rumbaugh, col. 4, line 57 – col.5, line 8.

Ukai, Komiya, and Rumbaugh do not specifically teach the chromaticity of each color emitted by respective emissive element and the chromaticity of target display white of the display device.

Codama teaches the chromaticity of each color emitted by respective emissive element and the chromaticity of target display white of the display device. Codama, col. 3, lines 5 – 10.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use chromaticity as taught by Codama with the color adjusted display of Ukai, Komiya, and Rumbaugh to produce a display with pixels adjust both for the emission efficiency of each

emissive element and for the chromaticity of each color emitted by each emissive element and the chromaticity of target display white of the display device. Codama teaches,

> [I]t is preferable to regulate the respective layers in conformity to chromaticity coordinates according to the NTSC standard or the current CRT standard. Such chromaticity coordinates may be determined by use of general chromaticity coordinates measuring equipment, for instance, BM-7 or SR-1 made by Topcon Co., Ltd.

Codama, col. 3, lines 5 – 10. By regulating the pixels according to the chromaticity coordinates, the display would be most pleasant to the human eye.

Claim 14

Claim 14 is dependant on claim 13 and adds that the size of the driving TFT of the display pixel of any one color, among the display pixel of various colors, is different from the size of the driving TFT of the display pixel of another color. Rumbaugh teaches that the size of emissive area of a pixel of any one color, among the display pixel of various colors, is different from the size emissive area of the display pixel of another color. Rumbaugh, col. 4, lines 51 – 55.

Claims 15 and 18

Claim 15 is dependant on claim 13 and claim 18 is dependant on claim 16. Codama teaches that the emissive element is an organic electroluminescence element comprising the emissive layer using an organic compound. Codama, col. 1, lines 10 – 14.

Claim 16

Claim 16 describes a color display device. As discussed in the rejection to claim 1, Ukai and Komiya teach a self-emissive element for emitting light of a predetermined color and a driving thin film transistor (TFT) connected to the self-emissive element for supplying a drive

current to the self-emissive element. As discussed in the rejections to claim 1 and claim 3, Ukai and Komiya in view of Rumbaugh teaches that size of the driving TFT in a display pixel for one color is set for every color in accordance with the emission efficiency of the emissive element disposed at the display pixel.

As discussed in the rejections to claim 13 and 14, Ukai, Komiya, and Rumbaugh, in view of Codama, teach that size of the driving TFT in a display pixel for red, for green, and for blue is set on the basis of the emission efficiency of the emissive element of each display pixel and a luminance ratio of red to green to blue in accordance with each chromaticity of red, green, and blue emitted by respective emissive element of the display pixel, and with the chromaticity of target display white of the display device.

Claim 17

Claim 17 is dependant on claim 16 and adds that the emissive area of the display pixel of any one color among the display pixel for red, for green, and for blue is different in size from the emissive area of the display pixel of another color. Rumbaugh teaches adds that the emissive area of the display pixel of any one color among the display pixel for red, for green, and for blue is different in size from the emissive area of the display pixel of another color. Rumbaugh, col. 4, lines 51 – 55.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Tang, USPN 5,684,365, teaches an electroluminescent element for a display panel wherein each pixel is controlled by a driving TFT and a switching TFT.

Nakamura et al., JP 10039791 A, teaches that the luminance ratios of emitted colors are controlled by changing the area ratios of the pixels.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leland Jorgensen whose telephone number is 703-305-2650. The examiner can normally be reached on Monday through Friday, 7:00 a.m. through 3:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven J. Saras can be reached on 703-305-9720.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office, telephone number (703) 306-0377.

lrj

STEVEN SARAS
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